

## Photonic and photochromic materials in material science, nanotechnology and nano-biosciences

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### 1. EDITORIAL

Photochromic materials and related other stimuli-responsive functional materials (such as, thermochromic, ionochromic, electrochromic, piezochromic materials) have been successful to draw active current research interests in a number of areas including – (a) material science, (b) nanotechnology, (c) nano-bioscience, (d) polymer and colour chemistry, (e) other fields of applied sciences and technologies. For this issue we called for articles that cover different areas of research, development and applications of photochromic and photonic materials. For examples, (a) studies on the conventional and high-tech applications of photochromic and photonic materials in modern lifestyles, (b) studies on synthesis, modelling and methods used to achieve these goals, (c) basic sciences involved with these processes. We have been successful to attract different groups of researchers who are actively contributing in research on various areas of stimuli-responsive functional materials.

This issue now presents five articles covering specific research areas of stimuli-responsive functional materials. Ichikawa and Nakano report a study on the phase separation and photo-induced deformation of domain structures of photochromic azobenzene and poly(vinyl acetate) based hybrid films. They observe that these films show thermally reversible phase separation and produce circular dissipative patterns and they also describe a technique to induce these patterns.

Kominato and Akitsu present a study on the photo-induced molecular orientation of chiral azo-Schiff base complex in polymethylmethacrylate (PMMA) or laccase matrices. This study observes that metalloproteins can act properly to exhibit their

biological functions (for examples, directional electron transfer and selective redox reactions) due to anisotropic environment of peptides and molecular orientation of active sites. They present a study of the polarized UV light induced molecular orientation of chiral Schiff base complexes with azo-groups in organic/inorganic hybrid materials and present the nature of new organic/inorganic hybrid systems composed of azo-containing chiral Schiff base – metal complexes and PMMA or a copper protein.

Fang, Meng, Wang, Jiang and Xu describe a study on a thermochromic ormosil coating for smart windows where they present an investigation on different features of an inorganic-organic hybrid based thermochromic functional coating on the glass along with the evaluation of the technical performances of the coating system for their suitability to use in smart windows.

Billah reports two studies where the first one deals with the behaviour of spirooxazine based photochromic dyes on solid matrices (textile and leather substrates) and the second study investigates the applications of molecular switches on porous flexible polymeric substrates (such as, paper, cotton, leather substrates) for conventional and high-tech applications.

So, five articles in this issue on selected areas of photochromic materials and other stimuli-responsive functional materials along with their selective uses in various fields would be interesting to the readers. Thanks to all contributors to this issue. We hope to produce several issues in future which will cover contemporary developments and future research directions in this area.